



Australian Government

Department of Education, Employment and Workplace Relations

MSATCM513A Plan and complete metallurgical projects

Revision Number: 1

MSATCM513A Plan and complete metallurgical projects

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers systematical planning, designing and problem solving within a metallurgy context.
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Application of the Unit

Application of the unit	Competency in this unit includes significant contribution to the planning, design and problem solving process for metallurgy applications. Planning, problem solving and design should be implemented systematically within the context of market or customer requirements and the prevailing industrial environment in accordance with planning and design parameters such as performance, financial, legal, resource and scheduling. Applications of planning and design in metallurgy may include the conceptual development, management, design, manufacture, implementation, commissioning and maintenance of products, processes, systems or services using metals and alloys into products and components into machines and systems for domestic, commercial, industrial, entertainment, civil, medical or military applications.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	<i>MEM16008A</i>	<i>Interact with computing technology</i>
	<i>MEM23061A</i>	<i>Select and test mechanical engineering materials</i>
	<i>MEM23071A</i>	<i>Select and apply mechanical engineering methods,</i>

Pre-requisite	MEM16008A	<i>Interact with computing technology</i>
		<i>processes and construction techniques</i>
	MEM30012A	<i>Apply mathematical techniques in manufacturing, engineering or related situations</i>
	MSATCM509A	<i>Recommend ferrous and non ferrous metals or alloys for an application</i>
	MSATCM510A	<i>Apply metallurgical principles and techniques in welding and other thermal processes</i>
	MSATCM405A	<i>Determine and supervise heat treatment of metal</i>

Employability Skills Information

Employability Skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Interpret the brief and clarify internal or external client requirements	1.1. Interpret the client's requirements for a metallurgical application. 1.2. Develop the project requirements and parameters with client.
2. Research and report on the context and parameters of the metallurgy project.	2.1. Research the context and parameters of the metallurgy project including the planning, design and problem solving process 2.2. Prepare a report on the commercial and metallurgical context and parameters of the metallurgy project.
3. Prepare concept proposal for metallurgical solution	3.1. A range of different approaches to achieving project objectives are generated. 3.2. Check feasibility of a range of metallurgical solutions against project parameters. 3.3. Assess metallurgical solutions for conformity to OHS&E requirements. 3.4. Seek opinions of colleagues and technical experts from other disciplines. 3.5. Prepare plan and concept proposal that includes results of feasibility study consideration including calculations and modelling 3.6. Concept proposal reviewed with client to improve outcomes and overcome possible problems.
4. Implement the planning, design or problem solving process for metallurgy project	4.1. Select and manage resources and processes to develop the plan or design. 4.2. Document management processes. 4.3. Appropriate components and systems are incorporated in the planning and design process. 4.4. Appropriate calculations and assumptions are used in implementing the planning and design process. 4.5. Appropriate computing hardware and software and programming techniques are used in the planning and design process. 4.6. Appropriate metallurgy and other scientific, engineering and commercial principles and knowledge are applied to implement planning and design process. 4.7. Concept proposal for metallurgical solution is reviewed against planning and design process in order to prepare firm metallurgical solution for

ELEMENT	PERFORMANCE CRITERIA
	client
5. Review metallurgical solution with client and prepare implementation plan	5.1.Review solution to ensure conformity with current specification, contract and organisational procedures, OHS and regulatory standards 5.2.Present and explain metallurgical solution and implementation plan to client including presentation of supporting documentation 5.3.Client acceptance of the design and implementation plan is achieved and documented.
6. Implement metallurgy project	6.1.All implementation documentation associated with project implementation is completed in accordance with organisational and statutory requirements. 6.2.Participate in implementation process and provide metallurgical oversight
7. Review metallurgical project outcomes	7.1.Project outcomes are reviewed in terms of the intended and actual outcomes and report is prepared.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills:

Competency includes sufficient knowledge of:

- the planning process for a comprehensive range of metallurgical applications
- market and industrial context and parameters such as financial, legal, resource and scheduling of the planning and design process for a significant and particular metallurgical application
- the procedures for documenting and confirming client requirements
- appropriate codes, standards, specifications and legislative and regulatory requirements
- implications for sustainability and options for improved environmental outcomes
- constraints and risks associated with the development and implementation of metallurgical processes
- process of analysis, comparison and contrasting
- concept proposal review process
- metallurgical fundamentals affecting selection of components and systems
- metallurgy related hardware and software
- properties of metal and alloys
- the significance of the document control process
- procedures for initiating and gaining approval for changes to metallurgy related processes
- metallurgy related tests and testing schedules
- reasons for selecting tests and schedules
- corrective actions to return metallurgical related processes to specification

Required knowledge:

- research and report context and parameters of the planning process for a comprehensive range of metallurgy applications
- plan and implement a significant metallurgy application within a market and industrial context and in conformance with project parameters such as financial, legal, resource and scheduling.
- document and confirm an internal or external client's requirements in accordance with organisational procedures and practices.
- inform client of known OHS, regulatory, ethical, environmental, physical and cost limitations
- write specifications to meet project requirements.
- document and agree on acceptance criteria with a client
- review different approaches to technical feasibility, innovation and acceptance to client
- document possible metallurgical product or process concepts
- analyse, compare and contrast the relative merits of possible metallurgical processes or

REQUIRED SKILLS AND KNOWLEDGE

- products
- document an objective analysis of each approach (eg. Weighted "trade-off" table)
 - discuss proposals with colleagues and specialists
 - document concept proposal in accordance with organisational procedures
 - establish the planning and implementation team in accordance with organisational procedures
 - identify resources and establish management procedures
 - select components and systems
 - negotiate, document and monitor outcomes and performance measures
 - develop work instructions
 - monitor and correct project progress
 - perform risk analysis and corrective action
 - assumptions and calculations for implementation of metallurgical processes
 - prepare design diagrams and calculations
 - apply metallurgical principles and knowledge in the implementation of the plan and design process.
 - select metallurgical related materials
 - select metallurgical methods and processes
 - create demonstration models
 - confirm a metallurgy solution and plan
 - authorise modifications to the metallurgy specification in accordance with organisational procedures.
 - incorporate corrections and improvements to the design into the revised design solution and plan
 - apply OHS&E and regulatory standards
 - complete documentation
 - obtain and review feedback from the commissioning process
 - monitor the project outcomes or performance in the implementation environment
 - address deficiencies in project outcomes or performance as measured against specifications

Evidence Guide

EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment

A person who demonstrates competency in this unit must be able to plan and complete metallurgical projects. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the ability to:

- interpret and clarify a metallurgical brief;
- research metallurgy related techniques and processes
- apply metallurgical skills and knowledge to solve metallurgical related problems;
- comprehensively describe the properties of metals and alloys;
- describe the performance parameters of metal processing equipment and materials including test equipment, furnaces, refractories, casting vessels, sands, patterns, etc.
- liaise with clients,
- establish project plans;
- monitor metallurgy project timelines, quality outcomes, and costs;
- report project outcomes.

Relationship to other units

This unit may be assessed concurrently with other relevant units.

Assessment method and context

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment.

Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or

EVIDENCE GUIDE**Resource implications**

numeracy skills beyond those required for the unit.

The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Parameters	May include: • competitiveness, • performance, • financial, legal, resource and scheduling implications of a metallurgical application.
Report	Reports will usually be written and include: • a description of the metallurgical processes involved in the project • commercial, production and fabrication implications of different metallurgical options • occupational health, safety and environment implications of metallurgical processes related to the project Reports may be prepared by a metallurgist working alone or in conjunction with engineers, technicians and other relevant personnel.
OHS&E requirements	Include: • ensuring that all organisational and statutory requirements are met • the workforce is not exposed to hazardous worksite conditions, materials and processes • the broader community is not exposed to environmental effects of the activity.
Implementation documentation	Documentation that requires metallurgical input includes: • Gantt charts • cost and other resource requirements • standard operating procedures and other instructions for enterprise personnel • special safety and maintenance instructions;

RANGE STATEMENT

	• production schedules
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Unit Sector(s)

Unit Sector	Metallurgy
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Competency field

Competency Field	
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Co-requisite units

Co-requisite Units		